

DESCRIPTION

FACSIMILE MACHINE, AND CONTROL METHOD, PROGRAM, AND
STORAGE MEDIUM THEREOF

5

TECHNICAL FIELD

The present invention relates to a facsimile machine, and a control method, a program and a storage medium thereof. The facsimile machine has an original conveying path in which an original is conveyed when performing a reading operation, and a recording conveying path in which a recording sheet is conveyed when performing a recording operation.

15 BACKGROUND ART

In general, in a conventional facsimile machine, an original conveying path in which an original is conveyed when performing a reading operation and a recording conveying path in which a recording sheet is conveyed when performing a recording operation have been completely separated (for example, see Patent Document 1).

Patent Document 1: Japanese Patent Application Laid-Open No. H08-163288

25 However, according to the above-described method, an edge sensor, a driving motor, and a conveying roller are required for each of reading and recording,

respectively, and therefore, there is a problem that such a method is disadvantageous in terms of miniaturization and cost cutting of the facsimile machine.

5 Hence, it is considered that the edge sensor, the driving motor, and the conveying roller are commonly shared with reading and recording.

 However, when a reading conveying path and a recording conveying path are commonly shared, a
10 reading operation and a recording operation cannot be performed at the same time. In case an attempt is made to perform a sending in the midst of facsimile reception, the facsimile reception is completed, then the recording of the received facsimile is performed,
15 and after the recording is completed, the sending is performed.

 That is, in the facsimile machine in which the reading conveying path and the recording conveying path are commonly shared, in case the sending of a
20 facsimile is intended in the midst of facsimile reception, it takes a time until the sending is executed, and there is a problem that inconveniences are experienced when the facsimile is desired to be urgently sent.

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DISCLOSURE OF THE INVENTION

 An object of the present invention is to

provide a facsimile machine, a control method, a program, and a recording medium of the facsimile machine, which facsimile machine can rapidly send a facsimile when the sending of a facsimile is intended
5 in the midst of facsimile reception in the facsimile machine in which the reading conveying path and the recording conveying path are commonly shared.

According to the present invention, in the facsimile machine in which the reading conveying path and the recording conveying path are commonly shared,
10 in case the sending of a facsimile is intended in the midst of facsimile reception, there are advantages of being able to rapidly perform the sending of the facsimile.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a facsimile machine 100, which is a first embodiment of the present invention;

20 Fig. 2 is a view showing a mechanism of the facsimile machine 100;

Fig. 3 is a view showing a mechanism of the facsimile machine 100;

25 Fig. 4 is a view showing a mechanism of the facsimile machine 100;

Fig. 5 is a view showing a mechanism of the facsimile machine 100;

Fig. 6 is comprised of Figs. 6A and 6B, showing flowcharts of a reading operation in the facsimile machine 100; and

Fig. 7 is comprised of Figs. 7A and 7B, showing
5 flowcharts of the operation of a second embodiment of the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

Best modes for carrying out the invention are
10 the following embodiments.

(First Embodiment)

Fig. 1 is a block diagram of a facsimile machine 100 which is a first embodiment of the present invention.

15 The facsimile machine 100 comprises a CPU 101, a ROM 102, an NVRAM 103, a RAM 104, a display unit 105, a reading unit 106, a recording unit 107, an edge sensor 108, an operation unit 109, a MODEM 110, and an NCU 111.

20 The CPU 101 controls the facsimile machine 100. The ROM 102 is a memory for storing a control program and the like of the facsimile machine 100. The NVRAM 103 is a non-volatile memory for storing various registered data and operation mode variables.

25 The RAM 104 is a memory, which stores image data and is used as a work memory necessary for the operation. The display unit 105 displays a state and

the like of the facsimile machine 100. A reading unit 106 reads an original when sending and copying are performed. The recording unit 107 records a received image and an image read when copying is performed.

The edge sensor 108 detects that a medium being an original or a recording sheet exists within an original/recording sheet conveying mechanism. The operation unit 109 consists of a plurality of keys, and issues an instruction regarding various operations. The MODEM 110 encodes and decodes an image read and an image received by the reading unit 106, respectively. The NCU 111 performs a network control for communication and sending-out of pulse signal.

Figs. 2, 3, 4 and 5 show a view of the mechanism of the facsimile machine 100.

The reading unit 106 consists of a CS (contact sensor) 22, a CS holder 26, and a reference white 25.

The CS 22 is usually located at a position shown in Fig. 2, and moves to a position shown in Fig. 3 only when reading. An original separating roller 15 has its one end coupled with a driving motor 20 through reading driving transfer means and driving switching means.

An ink cartridge 1 is mounted on a carriage 4 so as to perform an ink-jet recording. An actuator

21, a driving motor 20, and a conveying roller 10 connected to the edge sensor 108 are commonly shared at the reading operation time and the recording operation time.

5 Next, the reading operation in the facsimile machine 100 will be described.

 Figs. 6A and 6B are flowcharts showing the reading operation in the facsimile machine 100.

 When facsimile communication to the facsimile
10 machine 100 from a transmitter (not shown) is executed, a call signal arrives from a communication line. When this call signal is detected by the NCU 111, the NCU 111 is controlled, and the communication line is captured, and the MODEM 110 starts receiving
15 (S201, S202, and S203). The received image data is stored in order in the RAM 104.

 When the reception is completed, the NCU 111 is controlled, and the communication line is opened, and the received image is recorded in the recording unit
20 107 (S204, S218, S219).

 Now, while in the midst of reception, when a sending instruction (or transmission instruction) is newly issued from the operation unit 109 (S205), the reading unit 106 reads the original (S206). The
25 carriage motor 33 is driven and the carriage 4 is moved to the left, so that the driving switching means switches the driving of the driving motor 20 to

a reading mode, and returns the carriage 4 to a home position (position shown in Fig. 5).

5 The driving motor 20 rotates the original separating roller 15 through the reading driving transfer means, and starts an original feeding operation and, at the same time, operates the CS driving means through the CS driving transfer means so as to start moving the CS holder 26.

10 By adjusting a gear ratio between the reading driving transfer means and the CS driving transfer means and a roller diameter, the CS holder 26 is designed in such a way as to reach a position shown in Fig. 3 before an original 12 reaches a feeding roller 10.

15 When the CS holder 26 reaches a position shown in Fig. 3, a clutch that connects the CS driving means and the CS driving transfer means comes off, and the CS holder 26 stops.

20 When the driving motor 20 is still driven, and the original passes through the feeding roller 10, and reaches a position of the CS 22, the reading is started. The read image data is stored in the RAM 104. At this time, since the reception is not yet completed, the storing into the RAM 104 of the
25 received data, the reading operation of the original, and the storing of the read image data into the RAM 104 are performed in parallel.

The operation advances to step S207, and waits until the facsimile reception is completed or the reading of the original is completed (S207 and S208).

When the facsimile reception is completed
5 earlier, the operation advances to step S212, and the NCU 111 is controlled to open the communication line (S212), and the operation waits until the reading of the original is completed (S213). When the reading is completed, the driving motor 20 is driven in
10 reverse, so that the reading mode by the driving switching means is released and the CS holder 26 is returned to a position shown in Fig. 2. Then, a medium conveying path is opened for conveying a recording sheet, whereby recording of the received
15 image is started (S214).

On the contrary, when the reading of the original is completed earlier, the driving motor 20 is driven in reverse, so that the reading mode by the driving switching means is released, and the CS
20 holder 26 is returned to a position shown in Fig. 2. Then the operation advances to step S209, and waits until the facsimile reception is completed. When the facsimile reception is completed, NCU 111 is controlled to open the communication line, and
25 recording of the received image (S210 and S211) is started.

Next, to perform the sending of the original as

read, the NCU 111 is controlled to capture the communication line, and dialing is executed (S215 and S216). When the other party machine responds, the image data of the original as read and then stored in the RAM 104 is read out, and the MODEM 110 starts sending (S217). At this time, the recording operation of the received image data and the sending operation of the image data of the original as read are performed in parallel.

10 When the sending is completed, the NCU 111 is controlled, and the communication line is opened (S220 and S221).

 In the above described embodiment, though the read image data is stored in the RAM 104, it may be stored in the NVRAM 103.
15 (Second Embodiment)

 While the first embodiment is an example where the recording is started after the reception is completed, a second embodiment is an example where the reception is started at the same time the recording is started.
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 Figs. 7A and 7B are flowcharts showing an operation of the second embodiment of the present invention.

25 When facsimile communication to a facsimile machine 100 from a transmitter (not shown) is executed, a call signal arrives from a communication

line. When this call signal is detected by an NCU 111, the NCU 111 is controlled, and the communication line is captured, and a MODEM 110 starts receiving and, as the same time, the machine starts recording
5 also (S701, S702, and S703). The received image data is stored in order in a RAM 104.

When the reception is completed, the NCU 111 is controlled, and the communication line is opened (S704 and S723).

10 When an operation unit 109 newly issues a sending instruction in the midst of receiving a facsimile (S705), a recording operation is temporarily stopped after recording of page(s) being currently recorded is completed (S706 and S711). A
15 carriage motor 33 is driven, and a carriage 4 is moved to the left, so that driving switching means switches the driving of a driving motor 20 to a reading mode, and returns the carriage 4 to a home position (position of Fig. 5). By so doing, a medium
20 conveying path is opened for an original conveyance, and the reading of the original is started (S712).

The driving motor 20 rotates an original separating roller 15 through reading driving transfer means, and starts an original feeding operation and,
25 at the same time, operates CS driving means through CS driving transfer means so as to start moving a CS holder 26. By adjusting a gear ratio between the

reading driving transfer means and the CS driving transfer means and a roller diameter, the CS holder 26 reaches a position shown in Fig. 3 before an original 12 reaches a feeding roller 10. When the CS holder 26 reaches the position shown in Fig. 3, a clutch that connects the CS driving means and the CS driving transfer means comes off, and the CS holder 26 stops.

When the driving motor 20 is still driven, and the original passes through a feeding roller 10, and reaches a position of a CS 22, the reading is started. The read image data is stored in the RAM 104. At this time, the recording operation is temporarily stopped, but the receiving operation is continued by storing the received image data in the RAM 104, and is preferably performed in parallel with the storing of the read image data into the RAM 104. In the meantime, while the recording operation is restarted at S714, it is preferable that the reading operation is fully completed at S713 and a medium conveying path is opened for conveying a recording sheet so as to restart the recording operation.

When the reading of the original is completed, the driving motor 20 is driven in reverse, so that the driving switching means releases the reading mode and the CS holder 26 is returned to a position shown in Fig. 2. After that, the suspended recording is

restarted (S713 and S714).

When the facsimile reception is completed, the NCU 111 is controlled, and the communication line is opened (S715 and S716).

5 At step S706, when the facsimile reception is completed earlier than the completion of the recording of the page being currently recorded, the NCU 111 is controlled, and the communication line is opened (S707 and S708). Then, upon completion of the
10 recording of the page being recorded, the recording is interrupted, and the reading of the original is started (S710 and S717).

 Upon completion of the reading of the original, the interrupted recording is restarted (S718 and
15 S719).

 Next, to perform the sending of the original as read, the NCU 111 is controlled to capture the communication line, and dialing is executed (S720 and S721). When the other party machine responds, the
20 image data of the original as read and then stored in the RAM 104 is read out, and the MODEM 110 starts the sending (S722). At this time, the recording restarting operation and the sending operation of the image data of the original as read are performed in
25 parallel.

 When the sending is completed, the NCU 111 is controlled, and the communication line is opened

(S723).

While, in the above described embodiment, the read image data is stored in the RAM 104, it may be stored in the NVRAM 103.

5 According to the above described embodiment, the edge sensor, the driving motor, and the conveying roller are commonly shared for reading and recording, and the facsimile machine can be made compact and reduced in cost. Moreover, in case an attempt is
10 made to perform the sending while the facsimile is in the midst of being received, when the recording of page(s) being recorded is completed, the sending operation is immediately performed even when the recording is not yet made till the last page, and
15 therefore, when an urgent sending of a facsimile is required, it does not have to wait till the recording is completed.

 That is, the above described embodiment is an example of the facsimile machine, comprising: reading
20 means for reading the original, communication means for transmitting/receiving image data, first accumulating means for accumulating the received image data in a memory, recording means for reading and recording the image data following reading-out of
25 the same from the memory, transmission instruction means for instructing the transmission of the original, a medium conveying mechanism being

conveying mechanism common for the original and the recording sheet, and control means for controlling in such a way that the reading means performs the reading operation of the original to be transmitted
5 based on the instruction of the transmission instruction means precedently than performance of a recording operation of the received image data by the recording means in case the instruction means issues an instruction for transmission the original when the
10 communication means receives the image data and the first accumulating means performs a memory accumulating operation of the received image data.

Further, the above described embodiment can be grasped as an invention of a program. That is, the
15 above described embodiment is an example of the program, in a facsimile machine comprising a medium conveying mechanism being a conveying mechanism common for an original and a recording sheet, allowing a computer to execute: a reading procedure
20 for reading the original by reading means; a communication procedure for transmitting/receiving image data; first accumulating procedure for accumulating the received image data in a memory; a recording procedure for reading the image data
25 accumulated in the memory and recording the same by recording means; a transmitting instruction procedure for instructing the transmission of the original; and

a control procedure for controlling in such a way
that the reading of the original to be transmitted by
the reading procedure based on the instruction by the
transmitting instruction procedure takes precedence
5 over the recording of the received image data
performed by the recording procedure in case the
transmission of the original is instructed by the
transmission instruction procedure when the image
data is received by the communication procedure and a
10 memory accumulating operation of the received image
data by the first accumulating procedure is performed.

Further, the above described program may be
stored in FD, CD, DVD, HD, a semiconductor memory or
the like.

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This application claims priority from Japanese
Patent Application No. 2003-407977 filed on December
5, 2003, which is hereby incorporated by reference
20 herein.